MAINTENANCE AND OPERATION OF PFEFFER 2,5 DIESEL ENGINE

INTRODUCTION

This engine is an exact replica of the Pfeffer 2,5 diesel engine, developed and produced by Mr. Josef Pfeffer from Brno, a well known Czechoslovak manufacturer of modeller's engines. The prototype was builded in 1954, during 1955 - 1960 was produced in very small quantity. This engine was designed especially for free flight and control line contest models. Thanks to very modern design and high quality workmanship, its power was comparable to the most world engines of those years. Only a few of them, for the most part damaged, have been preserved up to the present day. This replica was born at the collaboration batween WORLD MICRO PLANES and NBN ENGINES company. It is a first engine in the "replica series" line, recomended especially for vintage model lovers and model engine collectors.

The production of this replica will be limited to 500 pcs and never will extend. Last 50 pcs of this limited series will performed as the "super collectors serie" shape, recomended especially for serious collectors and Pfeffer engine lovers.

We thank you for having bought this product and hope that quite complies with your ideas and requirements.

WORLD MICRO PLANES
sales agent of NBN engines

A. Getting familiar with the engine

1.SPECIFICATION

Two stroke diesel engine, intake by rear drum valve, crankshaft supported on two ball bearings, circulation scavenging with four transfer ports.

Bore	15 mm
Stroke	14 mm
Volume	2,47 ccm
Weight	155 g
Recommended speed	8000 - 11000 r.p.m.
Recommended prop	250/100 - 200/150 mm

2.ENGINE FUNCTION

With regards to the fact that this engine is not recommended for beginners, we pressupose at least a basic knowledge of operation and control of a diesel modeller's engine, and that is why we do not mention the customary instructions for starting and setting. At all events, it is necessary to realise that any adjusting and opetating must be carried out with feeling. Especially an excessive rise of the compression ratio by means of the compression lever or use of unsuitable fuels can cause a damage or complete destruction of engine functional parts. It is necessary to realise that a number of factors, e.g. air temperature and pressure, fuel composition, propeller size and form, and also engine machanical condition, influence the optimum setting of the compression lever and fuel needle.

3.FUEL

A correct fuel is one most important prerequisites for a proper function and good service life of the engine. The fuel for diesel engine contains high volatile aether, and therefore it is necessary to pay maximum attention to storage and handling, so as to make its evaporation and consequently fuel depreciation impossible. Using a fuel with low aether content, it is not possible to tune up the engine correctly-it does not keep set speed, it overheats itself and does not reach a sufficient power output. Besides, it needs a higher compression for running and appears as difficult to run. In case of these symptoms, look for defect first of all in the fuel composition or quality.

- Optimum fuel composition for:

	running in	sport service
aether	40%	40%
castor oil	40%	35%
kerosene	20%	25%

To achieve maximum output, use the fuel for sports service with addition of 2 - 3% amyl nitrate or isopropyl nitrite. However, it is necessary to point out that an addition of merely 0,5% substantially improves starting, running and output of the engine.

Important advice !

a) Nitrated fuel may not be used before a thorough running-in of the engine.
b) After application of the nitrated fuel, it is inevitable to rinse out the engine with standard fuel, so as to prevent corrosion of individual engine parts.
c) Filtration, chemikal purity and good quality of individual fuel components are unconditionally necessary for problemless engine operation.

4.PROPELLER

Use only first-rate, intact and well balanced propellers. Observe propeller manufacturers instructions, especially concerning maximum allowable r.p.m. and maintenance. Do not forget that an unbalanced airscrew will destroy not only your engine, but also engine bed, and as the case may be, the RC set. The propeller bore for the engine crankshaft must have only a minimal clearance, in case the propeller has an excessive bore, always use an reducing adapter insert. Regular test of the propeller balance are necessary.

- Recomended propeller sizes are as lollows:

a)	Engine running-in	250/100	(10/4")
b)	RC and free flight	250/100	(10/4")
	power model	250/125	(10/5")
		225/125	(9/5")
		225/150	(9/6")
d)	Control line model	200/150	(8/6")
		200/175	(8/7")

B. Engine running-in

Every engine is functionally tested by the manufacturer, however it has not been run in. We recommend that the engine should be run in on principal on a stand, consequently not in the model. In no case use for attachment a vise or other clamping aids that could damage the crankase or other engine part. Connect the fuel instalation, fit on the propeller and close the fuel needle. During the running in self proceed as follows:

- Fill the fuel tank so that the fuel level may be a few mm lower than the carburettor jet.
- Inject few drops of fuel throgh the exhaust port over the piston.
- With the compression lever released start to turn over the propeller at the same time gradually tighten the compression. It is necessary to react sensitively on the quantity of fuel being injected into the engine. If the engine runs too tough, release the compression lever and turning the engine rid it of excessive fuel.
- The engine starts consumes the injected fuel and stops. Repeat this process few times till the engine will starts reliable on the injected fuel.
- Open the fuel needle by 3 turns, blind the venturi opening with your finger and suck the fuel into the fuel hose so, that the fuel could not get in the jet and in the engine, but the end of the fuel column should not be distant of the jet more then 10 - 15 mm.
- Inject few drops of fuel through the exhaust port over the piston and the same quantity into the venturi.
- With the compression lever released start to run over the propeller at the same time gradually tighten the compression.
- The engine starts, sucks the fuel into the jet and runs.
- Set a low speed (6000 - 7000 r.p.m.) with compression lever and richer mixture with fuel needle. No doubt, the engine will not run regularly, but not even "hard", and it will not exceedingly smoke. Let the engine run 10 - 15 min. in this mode.
- After 10 - 15 min. run begin to slowly raise the r.p.m. by gradually tightening the compression lever and closing the fuel needle. If the speed begins spontaneously to drop oving to engine heating up quick enrich the mixture with the fuel needle and release the compression lever. The engine being cooled, you can attempt to raise the speed again. Repeat the whole process, as long as the engine is able to run at least 2 min. at full speed and quite regularly without loss of power output. Standart running-in period varies from 15 to 30 min., rather tight engines will not give of the maximum output before 1 hour's running. After this basic running-in, test the engine with the propeller that you will usually apply with your model. Should the engine after being adjusted for speed still incline to lose its output, go on running-in with this propeller, untill the engine is able to run trouble-free also under theese conditions. Since this moment you can consider the engine to be run-in and you can use nitrated fuel.

C. Mounting the engine in a model

Mount the engine in principle on a sufficiently dimensioned bed of hard wood or of aircraft plywood. See about easy access to the engine controls - the compresion lever and fuel needle. A well accessible venturi enables you simple cleaning of the fuel jet without this assembling the engine out of the model. With covering the engine, it is necessary to allow for a sufficient cooling air inlet. Place the tank near the engine to ensure shortest sunction height during the model climbing. Always use all the four holes for engine fastening.

D. Opetation of the engine in the model

The starting method is the same as at running-in of the engine. Since the engine fuel mixture will become rather leaner during the flight (owing to relief and higher r.p.m.), it is useful to regulate maximum speed at the model position with bow inclined 45° upwards. Carry out the first start with lower compression and richer mixtere.

E. Engine maintenance

In principle, do not disassemble the engine. Every, also for the best executed disassembly, reduce the engine life. In the case of extreme necessity disasemble only the complete crankase cover. In the engine becomes soiled (e.g. owing a crash), proceed in this way:

- In no case rotate the propeller.
- Disasemble carefully the engine from the model.
- Detach the crankcase cover (2 screw M3x8 mm).
- Wash the engine carefully with fuel by means of a syringe and oil thin with conservation oil the crank pin, the bore (through the exhaust port) and the crankshaft.
- Remount the crankcase cover.
- Test the crankcase cover tightness with fuel (bubbles at propeller turning out). In case of untightness replace the cover gasket.

Important advice !

a) Never forget to wash out the engine and conserve it with several drops of good conserving oil after every flying.
b) Entrust any repairs always to the manufacturer.

F. Guarantees

Full guarantee for manufacturing and material defects lasts six months from the purchase date. Transmit the defective engine to the address writted below. Describe briefly the troubles, if possible let know their probable causes. Provided that the defect will pertain to the quarantee for manufacturing and material defects, the defect will be repaired free. If the quarantee will not apply to the defect, WMP will inform of the repair extent and price. A condition of quarantee validity is a quarantee sheet confirmed by the dealer.

G. Important safety advices

- Do not start the engine in a room.
- Do not smoke while filling the tank with fuel or handling it.
- The diesel fuel is highly inflammable, keep maximum caution at storage and handling.
- Inhaling the fuel and its products during the engine run is unhealthy.
- For starting use an effective finger protection. An interference of fingers or another part of body with rotating propeller can result in very serious injuries.
- Never stand in the plane of the rotating propeller during engine run. A propeller rupture can cause very serious injuries.
- Protect your hearing by means of an effective protection.
- Secure that the onlookers stay at a safe distance vhen the engine runs.

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